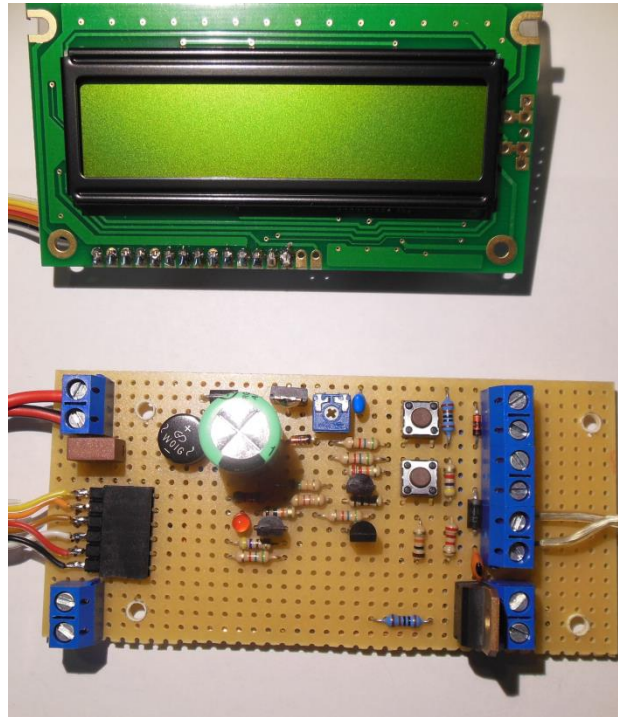


Windturbine Rotor speed guard



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Idea, development, realization	: Marc Van den Schoor
Translation NL – VS	: Marc Van den Schoor
Manual version	: 1.0
Schematic version	: 2



1 Introduction

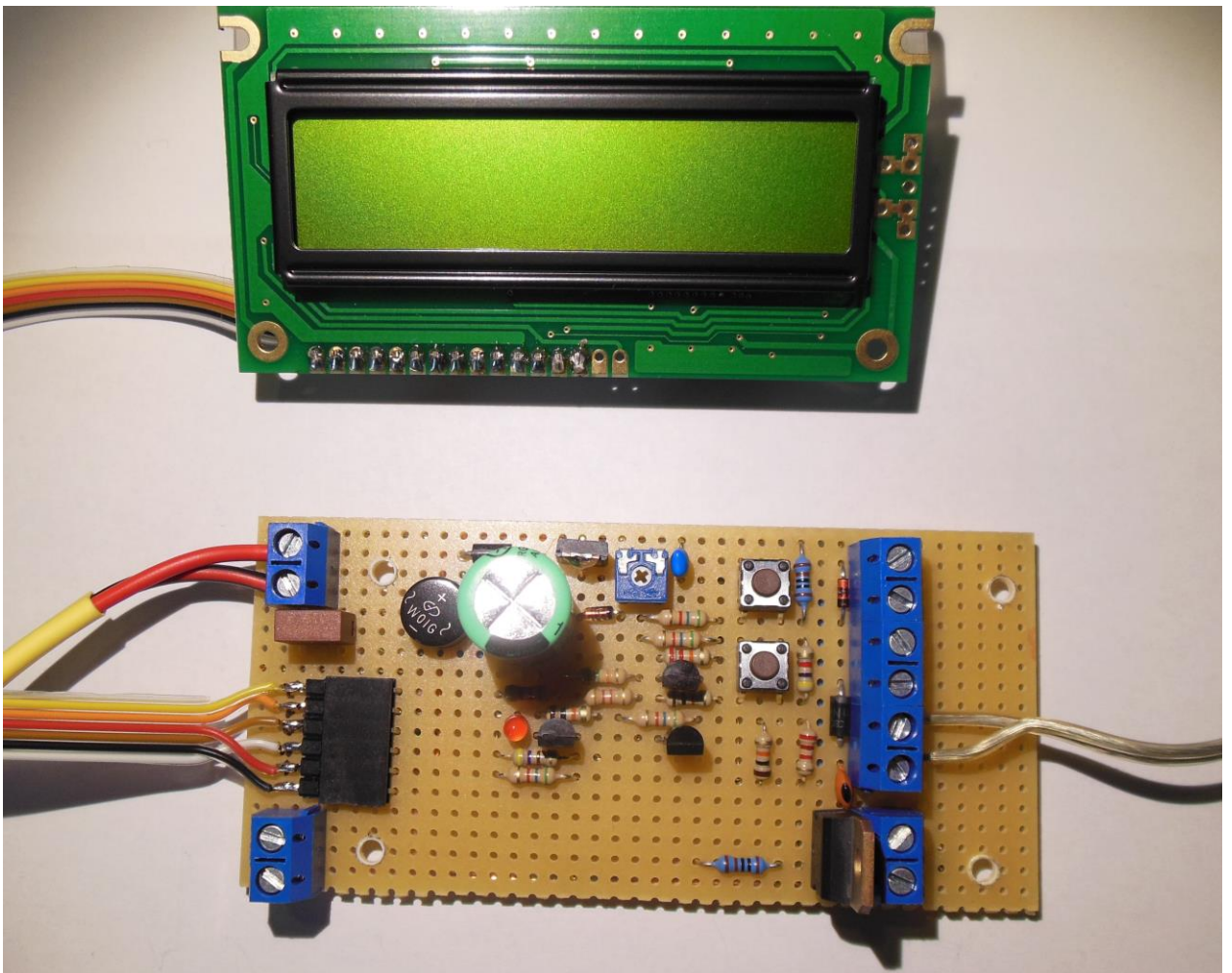
The rotor speed guard will be referred to in this document by the acronym RSG.

It is a PICAXE 18M2 micro controller based application that measures the rotorspeed of a small wind turbine. Above the constructive maximum allowed speed, the DC generator is used to slow down the rotor speed.

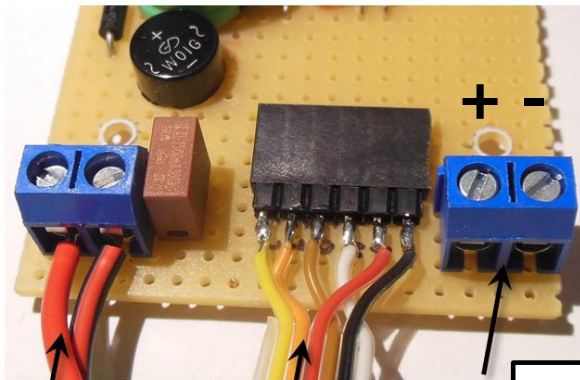
The braking action is based on the technique that shorts the rotor of the DC generator.

An AXE133 LCD is used to display RPM, wind velocity and status .

2 Appearance



3 Connections



Voeding van de module.
Power supply

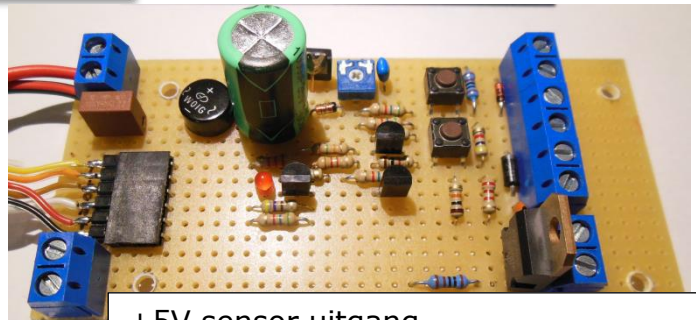
LCD aansluiting
LCD connection

Voeding remsysteem
Break circuit power supply

Voeding remsysteem

LCD aansluiting

Voeding van de module



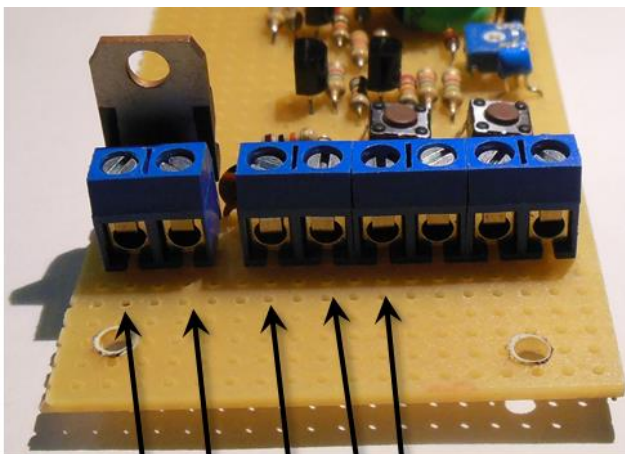
+5V sensor uitgang.
+5V sensor power output.

RPM sensor ingang.
RPM sensor input.

GND (-)
Power supply ground.

+ relais of generator.
+ relay or generator.

GND(-) remsysteem.
Ground (-) electric break circuit.



+5V sensor uitgang

RPM sensor ingang

GND (-)

+ relais of generator

GND (-) remsysteem

3.1 Module power supply

The module may be powered by AC as well as by DC.
Different absolute maximum voltages are to be observed.

AC : $19V_{\text{eff}}$ 50Hz/60Hz

DC : 27V

The RSG module power supply is not polarized do to the use of a bridge rectifier.

Expect a maximum operating current of 12mA

Advised supply parameters : 9V to 24V DC

The module is fuse protected against the adverse effects of on board failures, short circuit and overload.

3.2 LCD connection

Observe connector polarization!

Connect and disconnect only when the board is disconnected from the power supply.

3.3 Electric break circuit

Different configurations are possible.

For use on small DC generators up to 25W MRP the FET can be used to short the generator.

It's more appropriate for higher power levels to use an interface relay.

Circuit details depend on specific generator parameters and are beyond the scope of this manual.

The maximum voltage over the FET should never exceed 50V DC

FET datasheet extract

STripFET MOSFET – TO220 case

N - CHANNEL 50V

RDS_{on} 0.06 Ω

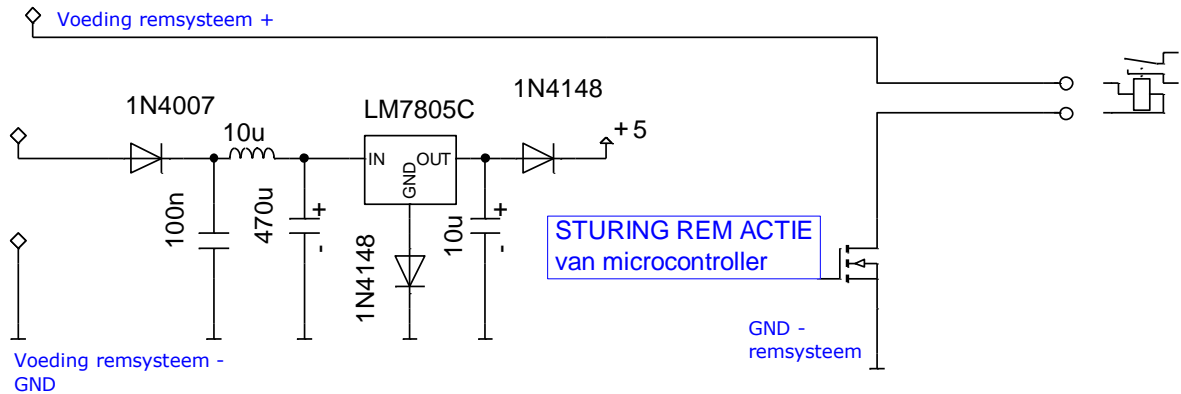
I_{ds} 23A

3.4 break circuit application examples

+ relay or generator - GND (power supply ground)

For this configuration power the Break circuit power supply with the relay operating voltage 6V to 24V DC.

The coil of the relay is connected as indicated in the below schematic.



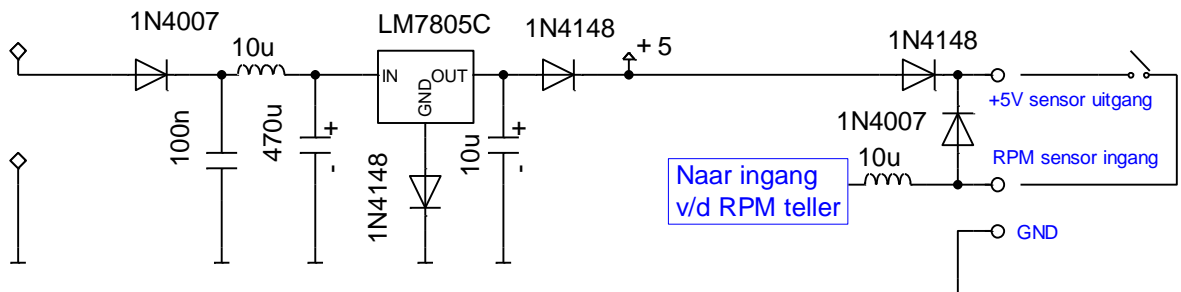
3.5 RPM sensor

De RPM sensor input is universal and can be adapted to many different sensor types.

Most common is the use of a reed tube that is activated by 1 or 2 permanent magnets on the rotor or generator shaft.

Optical 3 wire systems are possible as well.

RECOMENDED CONFIGURATIE



3.6 RPM sensor design considerations

The circuit is suited for pulse rates up to 50000 ppm - RPM.

The pulse rate capability of the circuit is not supposed to put any restriction on the application of the RSG module.

- Optical : max 50000 RPM
- Reed tube : max 1000 RPM.
- Micro switch : max 100 RPM.

4 Safety instructions

This manual is an integral part of the RSG module.

It contains safety instructions, application examples, RSG module limitations and design considerations.

The design parameters, suggestions for use, schematic and this manual is provided for information only as educational material.

These manual, the schematics, the firmware, the suggestions for use and the design examples have been prepared using the best endeavors of the author. They do not represent full design solutions and the author expressly disclaims any liability with respect to their accuracy or fitness of use for any particular purpose.

De RSG module is a module that completes an apparatus or machine. It is the responsibility of the one that implements this module to observe local regulations and safety instructions.

It is an absolute requirement to power the RSG from a safety power supply or battery.

The RSG has to be used in accordance with the prevailing EMC regulations.

5 Schematic

